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ABSTRACT

The theoretical and practical structure of a learning skills program based on an organization model is described. The first section of the paper deals with the description and implication of the program. Ideographic questioning and examination of a group of students and their study habits led to the development of an information processing model comprised of five parts: (1) input; (2) short term memory; (3) organization and consolidation; (4) long term memory; and (5) recall. Numbers one, three, and five were the focus of attention. Teaching techniques which facilitate success in these areas are discussed. The second section of the paper deals with an overview of results obtained from students who participated in the program. Grade point average and the Minnesota Study Habits Blank (Raygor) were the determinants of results. A brief discussion of the anticipated results of continued investigation concludes the article. (TL)

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LEARNING SKILLS AND INFORMATION ORGANIZATION

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Abstract

A learning skills program based on an information organization model is described. The usefulness of the program is supported by grade point average gains accrued by students participating in the program.

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Learning Skills and Information Organization

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and

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The purpose of this paper is to describe the theoretical and practical structure of a learning skills program built upon an information organization model. This model differs from that of other learning skills programs in that it has evolved from a conceptual base towards a teaching methodology and strategy, whereas most programs seem to have developed in a more or less uncontrolled manner without any theoretical baseline. The paper will be divided into two sections. The first section will describe the information organization model being used and will treat some of the general implications of this model for learning skills and reading programs. The section will also describe some teaching techniques built on the model, giving particular emphasis to methods of interrelating major concepts and main ideas. The second section will give an overview of some results obtained from students who have participated in the program and will describe selection procedures through which the usefulness of the program may be maximized.

Theory and Procedures

The single most important assumption upon which this learning skills program is based is that effective studying is an information organization process. Although other variables undoubtedly play into the equation of effective learning, it seems that, regardless of individual intellective ability, many students are not aware of or

do not perform well the important tasks of organizing information for efficient and effective input, structuring input for systematic relating to prior input, interelating new and old information, and providing systems of efficient recall. Other students seem to perform these tasks with a kind of naturalistic style without being aware of the systematic nature of their studying process. Idiographic questioning and examination of this second group of students, generally highly successful, led to the present paradigm.

Figure 1 presents a schematic drawing of the information processing model currently in use. Although it is a five part model, only three stages are actively considered in the learning skills program. Little if any attention is paid to short term and long term memory phases as these are considered to be purely storage phenomena in which little organizational activity takes place. As the computer programers, we are less interested in storage capacity itself than in the organization of material to be stored and the ease of recall of this material. Our hope is to allow the student to organize material well enough and with enough flexibility so that, in the manner of a random access computer, he can enter his information system at any given point and progress from this entrance point to any other given point. It is our belief that many students have difficulty in recall and presentation of material as they are inflexible in terms of entrance to stored information. Thus, if they are asked to retrieve and recall information in a manner somewhat idiosyncratic to their organizational scheme, they are unable to perform.

That this is a frequent phenomenon can be illustrated by the common example of a student who can not perform recall and usage tasks if the material has been presented to him in novel form but who if presented with the material in a form familiar to him, performs well.

The input stage of this model is relatively self-explanatory. Input can come through a number of sources and the learning can be purposeful or incidental. Attention, concentration and distraction problems are traditionally considered input phenomena and are treated at the input stage in most learning skills programs. In this program, we spend little if any time discussing these problems, but call them to the attention of the students and suggest some effective methods to deal with them. There is some evidence that attention span and distractibility are related to basic personality variables such as introversion-extraversion and that these variables are important in setting time and structural limits on input process (Whitehill and Jipson, 1969, Forlano and Axelrod, 1937). At the present state of our program, we are not working with these variables but hope to include them in the near future.

Our goal in dealing with the input process is to eliminate as much non-focused incidental learning as possible and to maximize purposeful or direct learning. To do this, we use the relatively traditional techniques of surveying and questioning. We apply these strategies to both reading and listening tasks. The point of difference in our application as compared with the traditional application is that we present surveying and questioning as methods of prestructuring or prefocusing input, we do not carry through the formal requirements

of programs such as Smith et. al. (1961) or Robinson (1961). We are concerned with the student acquiring a frame of reference or attention set within which he can approach the material being presented. This set may be highly individuated to the student, in fact it probably should be, and does not have to be complete in its specifications nor correct. It serves to allow the student to provide himself with real-time feedback as he reads or listens to the information being presented. Thus this set allows a continual focusing process that maximizes attention and thus purposeful learning. When the survey or questions do not serve to provide this set for the student, we have him change questions or alter the survey on a real-time basis thus insuring some congruence of the student's frame of reference and the structure of the material. As presented in Figure 1, there is a feedback loop operating continually between input, organization-consolidation, and preopganization. Thus preorganization is not conceived to be a single trial process.

The organization and consolidation phases are central to this type of learning skills program. It is our conviction that students who do not study effectively are generally naive to the necessity of organizing information into an individually useful and flexible structure. We therefore spend a reasonable amount of time explaining the concepts of consolidation and organization and we present the students with a good deal of background, both empirical and speculative, to point out the value and necessity of good organization. This exemplary material seems very useful from an evangelistic or motivational point of view and is derived from the concept formation and

memory literature as well as the work on attentional or cueing behavior. As intimated above, we spend a great amount of time emphasizing the entrance and exit flexibility requirements of useful organizational structures. We outline what is known about consolidation time, interference phenomena, and reactive inhibition. At this point, we ask the student to begin organizing material for himself in a manner most useful to him. As different students use different organizational schemes and as different material demands different organizational formats we present several general organization models. The first is SQ3R based and pretty well follows a sequential or outline format. This particular scheme is relatively easy for the student to learn but is somewhat limited in usefulness in terms of conceptual integration or inter-relation. It is appropriate for course material that has an underlying linear structure but not for more complexly structured material.

The second model we present is in the form of a conceptual hierarchy or tree. This implies an organization based on one or more central concepts, loosely related to each other, with less general concepts forming the branches of the tree. This again is a relatively easy model for the student to learn and use although it requires more thorough andintegrative effort than the outline model presented above. Entry flexibility is somewhat better than the pure outline model but is still not high.

The third model we present is based on either a two or three dimensional matrix. The boundaries of the matrix are formed by the most general useful classifications of material. If possible, both boundaries should be of the same level of generality. Thus in a two

dimensional matrix in the art history area, we may have stylistic variables on one boundary, period and theme variables on the other with the cells being occupied by artists and specific works. A complementary matrix could be designed with artists on one boundary, stylistic variables on the other with the cells being filled with periods and works. Usually we advise that the student construct more than one matrix in any particular area. We instruct the student to make the matrices as concise and compact as possible given the information necessary. The amount of thought and effort used in matrix construction is quite high, and the skill takes considerable practice to reach a high level of usefulness. The technique is quite useful with material that has implicit integrative bases that need to be made overt for adequate understanding. It allows considerable entry and exit flexibility, if the matrices are well thought out and constructed, and forces the student to take a very active role in the learning process. In general, we have found that two dimensional matrices are the most useful although with highly complex material and with sophisticated students, three dimensional constructions may be valuable.

The three organizational models are presented as aiding in the natural consolidation process. The activity and thought needed to generate good organization is presented as an aid to both original learning and retention. We also underscore the point that material that is well organized is apparently more available to recall and review of this material, well learned and well structured in the first place, is <u>actually</u> a review process and is not relearning. We also emphasize that this kind of organizational process is more useful if

the material has been prestructured well during input. Thus if the student cannot integrate the material in some satisfactory manner, he is advised to reorganize his input using the prestructuring techniques presented in the input phase of the program as well as any preliminary organizational schema he has been able to develop. This is in accord with the real-time feedback principles explained above.

The review stage of this learning skills program is similar to the review prescribed in most learning skills programs. We concentrate on the variables of frequency and conceptual interrelation. We do not advise detailed or memorization-based review procedures. We explain learning and forgetting curves to underline the importance of frequent, well-spaced review procedures. We underline the importance of the general real-time feedback procedure that is emphasized throughout the course. The effectiveness of review is shown to be dependent upon the efficiency and skill with which the input and organization phases of the program have been performed. Given good organization, effective review is not a difficult endeavor.

Results

We have been offering this learning skills program for four semesters, and for three of these periods, we have follow-up data in terms of grade point averages (GPA). It is our feeling the G.P.A. is the best, if not the only, meaningful criterion of the effectiveness of a learning skills program. Thus, although we have a good deal of other data concerning tenure in school, student's feelings about courses, and other associated variables, our discussion in this paper will be limited to results in terms of G.P.A.

Three types of results will be presented. The first concerns freshman students enrolled in the course during their first semester of University residence. Thus, no pre-course G.P.A. figures will be available for them and they will be compared with comparable students who did not take the course. Due to questionable randomization assumptions, no significance figures will be presented for these groups. The second type of results concerns students who had attended the University previously and thus had pre-course G.P.A. figures. For these groups, mean difference scores were calculated on a pre-G.P.A. post-course G.P.A. basis. Again due to questionable sampling procedures, significance figures will not be presented. The third type of result to be presented is correlational in nature. All students who took the study skills course were required to complete the long form of the Minnesota Study Habits Blank (Raygor). This is a 100 question test of study procedures and habits. It is not primarily a test of learning skills knowledge in that it concentrates on the actual practice of the student rather than ideal procedures. Although the test is divided into eight subsections, we do not break down the scores but use only total score in our results. As we gather more data, we hope to be able to be more precise in our treatment of the Study Habits Blank scores. At present though, we are simply correlating total score results on the Study Habits Blank with G.P.A. difference pre-course post-course.

Table 1 gives the mean G.P.A. figures for experimental and control groups of first semester freshman subjects (Ss). Ss were relatively well matched on reading speed, College Qualification Test

verbal and math scores; and high school percentile rank. For the first two gropps, selection of control Ss was on a random basis. For the third group, control Ss were self-selected; a question of sample bias thus is pertinent. The overall mean difference for these 92 Ss were +0.44.

Table 2 gives mean G.P.A. and mean difference scores for those Ss participating in the learning skills course who had previously established a G.P.A. at the University. These Ss were acting in an "own control" design. The overall G.P.A. difference for these 45 Ss were +0.45.

Table 3 gives product moment correlation coefficients between the Minnesota Study Habits Blank and grade point average increment. These correlations are based upon the same subjects as the data given in table 2. As a high score on the Minnesota Study Habits Blank infers good learning skills knowledge and efficient performance, one would expect high scorers : to profit very little from a learning skills course. Low scorers would be expected to gain more from the course. The correlations obtained support these predictions. The relatively high negative correlatinns between the study habits test and G.P.A. increment infer that low scoring Ss produce high pre-course post-course G.P.A. gains while high scoring Ss produce little gain. A bivariate distribution shows this to be the case. A check was made to see if high scoring students on the Study Habits Blank were high G.P.A. students previous to the course. If they were, this would limit the progress they could make in the course and one could possibly predict some regression towards the G.P.A. mean on their part. Fortunately, the distributions of pre-course G.P.A.s among high

and low scoring students were very similar with neither group showing any significant bias.

Discussion

The outline of results given above lends some credence to the effectiveness of the information organization approach to learning skills outlined earlier in the paper. It is particularly interesting that the G.P.A. increments cluster in the 0.40 - 0.50 range. This could be interpreted as supportive of a "Hawthorne" effect among the Ss: that is that the attention alone led to positive results. The correlational data belie this explanation. If a "Hawthorne effect" was responsible for these results, one would not expect differential susceptibility to such an effect to be measured by the Minnesota Study Habits Blank. Conversely, it would seem that students who possess little learning skills knowledge and/or performance are differentially affected in a positive fashion by this learning skills program.

We are continuing our investigation of this type of learning skills format. As we accumulate more data, we hope to differentially analyze the Study Habits Blank. We also hope to expand the penetration in terms of numbers of students served by the program and in the future develop some textual material based on the information organization frame of reference.

Table 1

Mean G. P. A. of First Semester Freshman Subjects

Control		Experimental		Mean Difference
N	Mean	N	Mean	
10	2.05	10	2.53	+ 0.47
9	2.20	9	2.66	+ 0.46
20*	1.52	73*	1.95	+ 0.43

*The students were enrolled in the University's five year special scholarship program. 73 Ss were in the study skills course; 20 did not participate. A possible bias in samping thus exists due to self-selection.

Table 2

Mean G.P.A. of Ss Previously Enrolled in the University

N	Pre-course	Post-Course	Mean Difference
10	2.28	2.62	+ 0.32
10	2.63	3.11	+ 0.48
25	2.31	2.80	+ 0.49

Table 3

Product Moment Correlation Coefficient Between

Minnesota Study Habits Blank and G.P.A. Gain

N	r	p
10	- 0.88	0.01
10	- 0.71	0.05
25	- 0.43	0.01

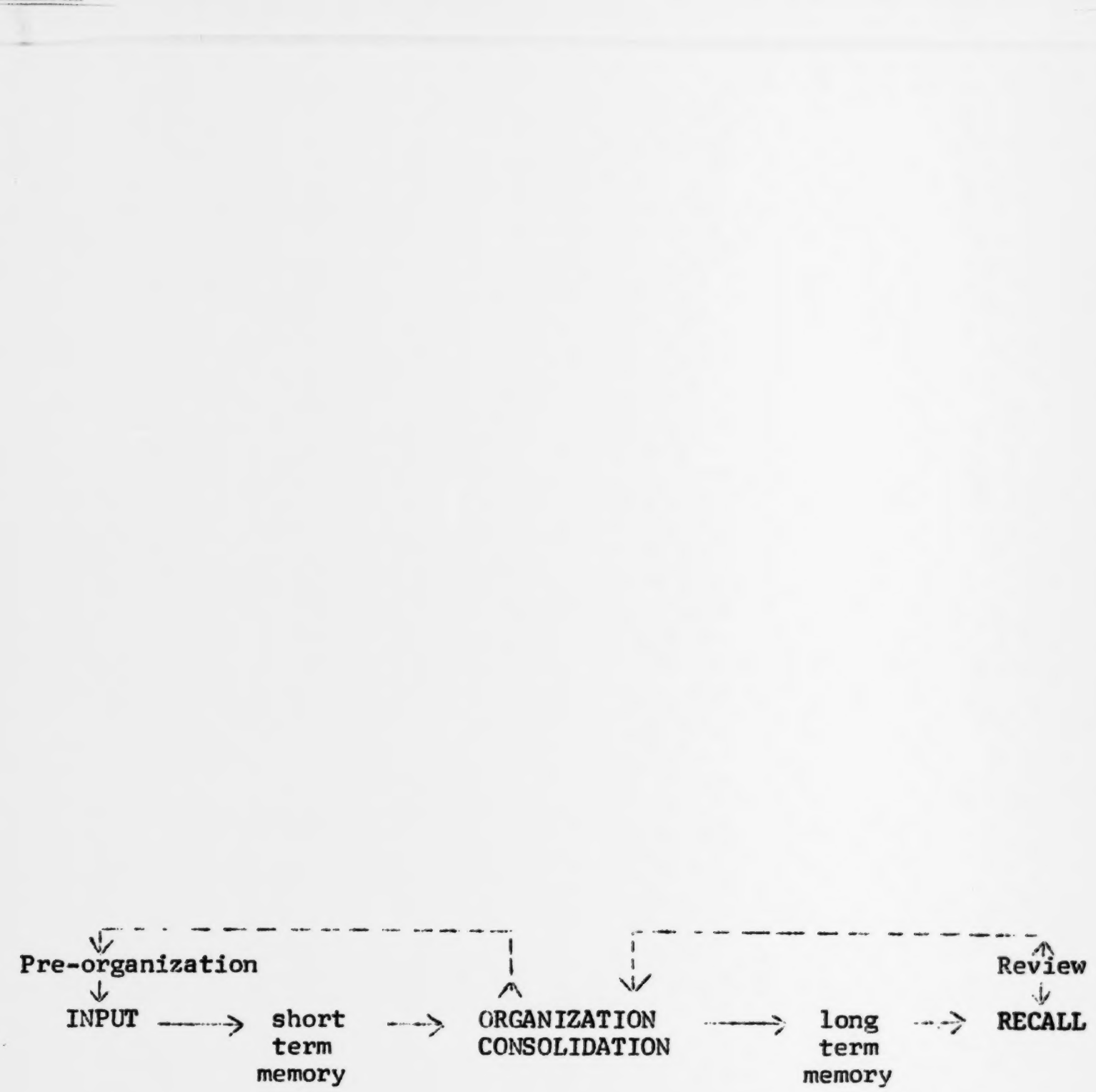

Figure 1. Present Information Processing Model.

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